FLIGHT
The AIRCRAFT ENGINEER & AIRSHIPS

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER

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EDITORIAL COMMENT.

IN this week's issue of FLIGHT we publish an illustrated description of the first American-built rigid airship, the Z.R.1, or, as she is now named, the Shenandoah. Appropriately enough, authentic detailed information is now also to hand relating to the acquisition by the American Goodyear Co. of the patent rights of the Zeppelin Company of Friedrichshafen. Both matters are, or may be, of the very greatest importance, and may well in the future prove to be the real foundation of American air supremacy, at any rate in regard to lighter-than-air aviation. By the Goodyear-Zeppelin agreement the American firm has obtained exclusive rights for the United States and Canada for the manufacture of Zeppelin-type airships and all airship material, including airship engines, and it is intended to organise a new company, subsidiary to Goodyear, which will be managed and controlled by the latter, but on which the Zeppelin interests will receive a minority representation in exchange for their patent rights and for the services of the Zeppelin technical staff.

Airships

It is stated that no cash payment has been made, and that the sole compensation to the Zeppelin company is the minority interest referred to above, which assures that firm an equitable share in any profits which the new company may make. In this connection it is of interest to review briefly the past work of the Zeppelin company, so as to form, in this way, a better idea of what it is the American firm has acquired. Into the early history of Count von Zeppelin, Germany's "Grand Old Man," there is no need to enter here. It will be remembered that his first endeavours were not crowned with success, and that as a result of an accident to an early Zeppelin airship the Count was threatened with financial ruin, until a public subscription succeeded in raising sufficient money for him to be able to continue his work. It is probably not generally realised that during the years 1900 to 1919 the Zeppelin company of Friedrichshafen, on the shore of Lake Constance, built no less than 115 rigid airships, of which three were experimental, nine

commercial, and the rest military. It is stated, and is probably correct, that at the end of the War no less than 12,000 workmen were engaged at the Zeppelin factory. Then came the Treaty of Versailles, which limited the size of airship that Germany was permitted to build to such an extent as virtually to preclude the production of ships of any practical value. If, therefore, Germany was to continue with airship development her only opportunity to do so lay in transferring her works to some country outside Germany. The Goodyear-Zeppelin agreement confers on America the benefits of the experience gained by the Zeppelin experts during more than 20 years of experiment and research. The fact that the United States possesses the only supplies of helium in the world, at any rate in such quantities as to enable it to be used commercially, adds enormously to the significance of the new agreement. It is fairly safe to assume that had the German airships been filled with this gas during the War the task of bringing them down would have been immensely more difficult than was the case. In fact, it would seem that when the danger due to hydrogen is removed, the vulnerability of an airship is reduced by something like 80 per cent., although the presence of petrol on board still constitutes a danger in a military airship.

The Zeppelin company drafted plans for commercial trans-Atlantic airship services, but while the restrictions imposed by the Treaty of Versailles tied them down, these plans could not be realised. Now, however, that the Goodyear company has acquired the building rights, and will, moreover, have the assistance of a corps of experienced Zeppelin designers and builders, there is little doubt that some of the plans which have hitherto been but dreams will become stern realities. Already it is stated by the Goodyear company that within sixty days a thoroughly experienced technical staff will be at work at Akron, Ohio, and will be prepared to co-operate with Washington or with any other responsible interests that may desire to embark on definite constructive projects. It is known that a careful survey has been made by Zeppelin engineers for the establishment of a twelve-hour New York to Chicago airship service, and the organisation of an airship-operating company is foreseen when the manufacture of the great air liners gets under way at Akron. Five types of ships have been evolved, which may be regarded as standardised, and of which the Zeppelin engineers have so great experience that they are in a position to guarantee their performance.

In Spain, as is well known, an airship scheme of considerable magnitude and importance is under way, and as the new Zeppelin transfer to America relates to the United States and Canada only, the Spanish scheme will, presumably, not be affected. By this scheme it is intended to establish an airship service between Seville and the Argentine, a start being made first with smaller ships, built in Germany coming within the limits imposed by the Allies. These ships are intended to be used between the mainland and the Canary Islands, and are intended chiefly for the training of crews. The larger ships for the Atlantic route will be built under licence in Spain, and will be stationed at Seville.

While all this activity is going on abroad, what are we doing? It is now many months since the Burney airship scheme was first drafted, and since that time the scheme has undergone various modifications. It has now been "accepted in principle," but that seems to be about as far as we have got, and although it has been officially stated that a start will be made, it seems obvious that, even if action is taken at once, it will be at least two years before the first ship can take the air. Then there is the question of personnel. Owing to indecision in Government circles the excellent personnel which we had at the end of the War has been dispersed, and if a fresh start is indeed made later on it will be a matter of the greatest difficulty to gather together the necessary personnel for the operation of an airship service of any sort.

What makes the position all the more intolerable is the fact that if our Government had had any sort of a policy a start could, and would, have been made long enough ago. The Zeppelin company were prepared to enter into an agreement with a British company, somewhat on the lines of the Goodyear-Zeppelin agreement, receiving a small share of the profits as their compensation, and employing British labour entirely. An option on Howden was acquired, and a well-known shipping company promised a large share of the money necessary. Owing to the indecision of the Government the scheme came to nothing. The position is unsatisfactory, to say the least, but fortunately it is not yet too late to make up for the time and opportunities lost, but it is essential that action be taken at once. The United States score through being the sole possessor of helium gas, but there are airship experts in this country who consider that as good results may be obtained by surrounding the hydrogen-filled gas bags with an outer layer of inert gas. Then there is the very considerable advantage of the addition of hydrogen to the fuel, an advantage which improves the economy of running, which the helium-filled ship does not share. On the technical side, therefore, we are not hopelessly out-classed—as yet, at any rate—and if proper financial arrangements are made without further delay we may still hope to take our place in the world's airship industries.

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The F.A.I. and World's Duration Records

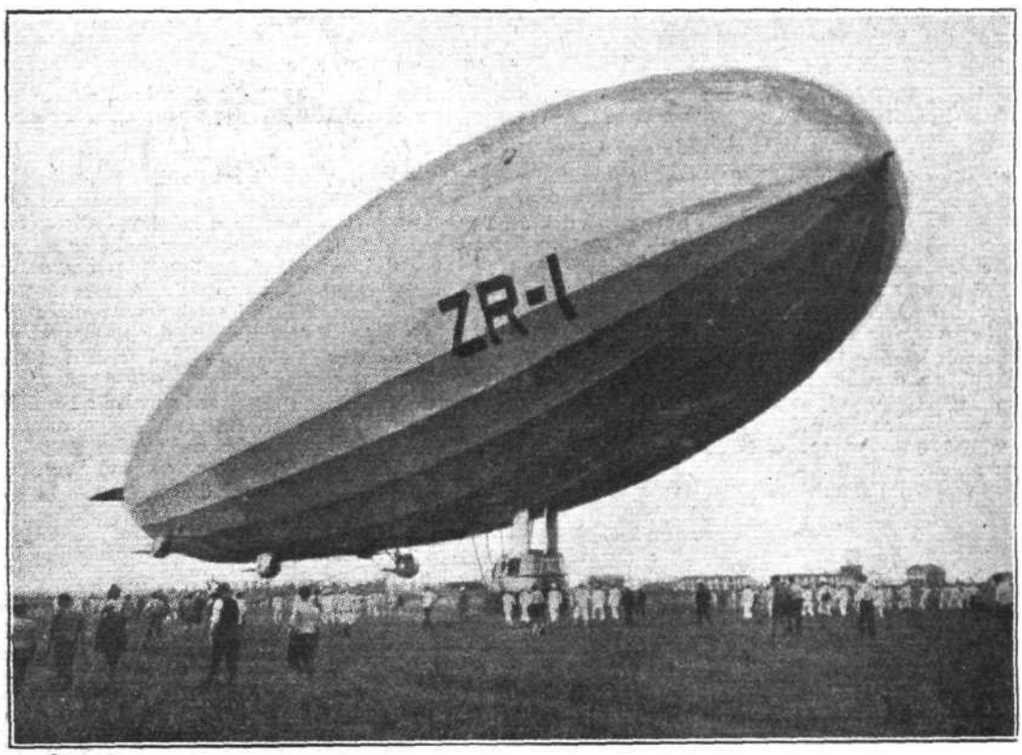
The *Fédération Aéronautique Internationale* has now homologated as a world's record the flight made by Lieuts. Smith and Richter when they remained in the air for more than 36 hours, flying a D.H.4 aeroplane with Liberty engine. During the flight the machine was refuelled 15 times, and there was some doubt whether, in view of this fact, the flight would be homologated. Probably the F.A.I. had no option but to recognise the performance, but the question now arises whether, in the future, such flights should be admitted. The main object of duration flights should be to encourage the production of load-carrying machines, and this object can scarcely be said to be attained when the fuel is replenished during flight. In fact, the D.H.4 machine used carried little more than its normal fuel supply, and would have been quite incapable of a duration even approaching that established. The problem of refuelling during flight is one of extraordinary interest, and one that may have useful application, but it should not, we think, be admitted in flights for world's records, or rather, if it is, then a distinction should be made between records established by machines carrying their fuel on board and those put up by machines taking fuel on board during flight.

FLIGHT

Z.R.1, THE FIRST AMERICAN-BUILT RIGID AIRSHIP

IN view of the recent liveliness in respect to rigid dirigibles, the following notes on the American airship Z.R.1 may be of interest. The plans for Z.R.1 were started towards the end of 1919, but it was actually laid down in the beginning of 1922, and was practically completed by last August, when the launching tests were carried out in the hangar at Lakehurst, where the ship was constructed, on August 20. The launching was supervised by Comdr. R. D. Weyerbacher, U.S.N. (who had charge of the assembling of the airship), and consisted in gradually releasing from the ballast tanks 32 bags, or 8 tons, of water. Some 300 marines and sailors held the ship down as it rose and guided it across the hangar, when it was then anchored and shed tests commenced. On September 4 Z.R.1 was taken out of the hangar, and the first trial flight successfully accomplished.

Before recording the details of this trial flight it may be as well, perhaps, to give the following particulars of Z.R.1. Generally speaking, the Z.R.1 resembles the more recent type of Zeppelin, or R.34, both in appearance and in many constructional details. However, whilst the Z.R.1 is admittedly modelled on the Zeppelin, there are embodied in its design several modifications and, it is claimed, improvements. The factor of safety in Z.R.1 is much larger than in any other rigid.



Z.R.1, the First American-built Rigid Dirigible: The Z.R.1 is 680 ft. long, and has a capacity of 2,150,000 cubic ft. of helium. It is fitted with six 300 h.p. Packard engines. It is shown here just before making its maiden flight on September 4.

The construction, from start to finish, of a rigid airship in America entailed many difficult problems calling for numerous calculations and much research work, whilst the disasters to Z.R.2 (R.38) and the "Roma" led to a thorough investigation being made into the designs of Z.R.1 including a series of experiments and tests on models and full-size girders, etc. In the production of the aluminium alloy alone was presented a serious problem. As far back as 1916 Comdr. Hunsaker had called to his assistance the Aluminium Co. of America in this connection, and after considerable experiment the metal was finally produced in quantity and of highly satisfactory quality. The problem of fabric was turned over to the Goodyear Tire and Rubber Co. This firm, it may be of interest to mention, purchased the intestines of 1,400,000 cattle before the 900,000 satisfactory skins necessary for manufacture into gold-beaters' skin were obtained.

The production of the engines was handed over to the Packard Motor Car Co., who were requested to develop a six-cylinder of 300 h.p. Actually they produced an engine developing 357 h.p., which, it is claimed, is superior to the Maybach engine used in the original Zeppelins.

The Z.R.1 has an overall length of 680·15 ft. and a maximum diameter of 78·74 ft. Its height, from the bottom of the engine cars to the topmost observation post amidships is 93·18 ft. The hull framework follows more or less usual Zeppelin practice, and consists of 25 longitudinal girders and 20 main transverse rings—24-sided. The latter are wire braced transversely, and between each main ring is a secondary ring. The rectangles formed by the longitudinal girders and the rings are also wire braced. The twenty-fifth longitudinal girder is located some 10 ft. up from the bottom of the hull and is joined to the two lower girders by a series of inverted V girders, thus forming a triangular passageway along the bottom of the hull from bow to stern. The main rings divide the hull into 20 compartments, each of which contains one of the gas-bags. These are made of light cotton fabric, with gold-beaters' skin rubber-cemented to the inner surface.

Over the framework of the hull is an outer covering of light-weight cotton fabric, laced in sections to the girders, with bands of fabric cemented over the junctions of the sections. The fabric is covered with an aluminium dope on its outer surface and with black dope on its inner surface. This method of doping, which has given satisfactory results in practice, helps to diffuse light and heat rays which would otherwise produce abnormal changes of temperature and pressure of the gas in the inner gas-bags. These latter are filled with the non-inflammable gas Helium to the total capacity of 2,150,000 cubic ft. Incidentally, it may be of interest to note that it cost a quarter of a million dollars to fill the Z.R.1 with this amount of Helium.

Suspended beneath the hull are six streamlined cars, constructed of duralumin. Each of these cars contains an engine. Car No. 1 is farthest aft; next come Nos. 2 and 3, one on each side of the hull; and amidships are Nos. 4 and 5, also at each side, but closer in. Right forward is No. 6, which contains the control and wireless stations as well as the engine section.

The control car is the quarter-deck of the airship. Its power-plant is aft. Next is the radio compartment, and next the control quarters themselves—a space but 18 or 20 ft. long, 10 ft. wide and about 9 ft. high. In this the captain, his executive officer, the officer of the deck, the steering coxwain and the elevator coxwain are stationed. Back of them are the radio operator and the chief engineer. The control cabin is completely enclosed with mica sheets. Right in front is the directional wheel, controlling the rudder; to the left is the elevator wheel. Running backward through the ship for nearly 700 ft. are the control wires, four in number for each control. The factor of safety is further increased by the location, three-quarters of the way aft, of a duplicate set of controls, for use in case of necessity.

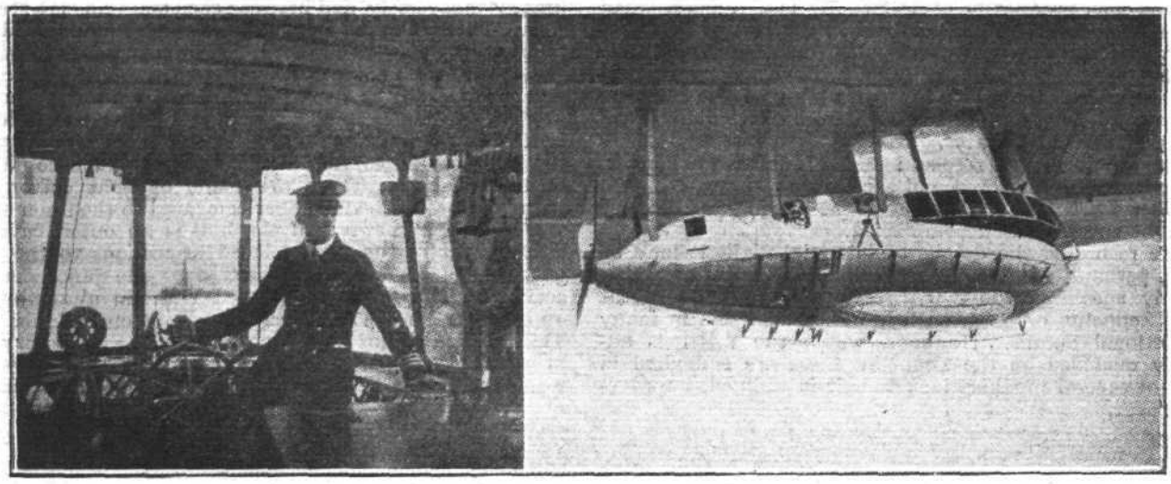
Controls are balanced by auxiliary panels mounted forward of the control surfaces.

The captain's position is at the right of the directional wheel. To his left is the executive officer. To the right of the captain is the chart-board, and round about, in apparently every possible place, are the instruments—not only the ones used in ordinary marine navigation for making calculations of position, but ones especially developed for the air. There are five inclinometers indicating the longitudinal position of the ship, and also instruments to show whether she is on an even keel, drift indicators, compasses, thermometers and pressure and temperature indicators for the gas. To the right are the control valves for the water ballast (carried in bags along the " cat-walk ") and controls for the docking lines. To the left are the controls leading to 16 gas valves, with an arrangement that, if quick action becomes necessary to force a descent, the gas can evenly be valved throughout the ship. Indicators are also fitted which show if the controls are functioning properly, whilst another set of German instruments show the rate of ascent or descent.

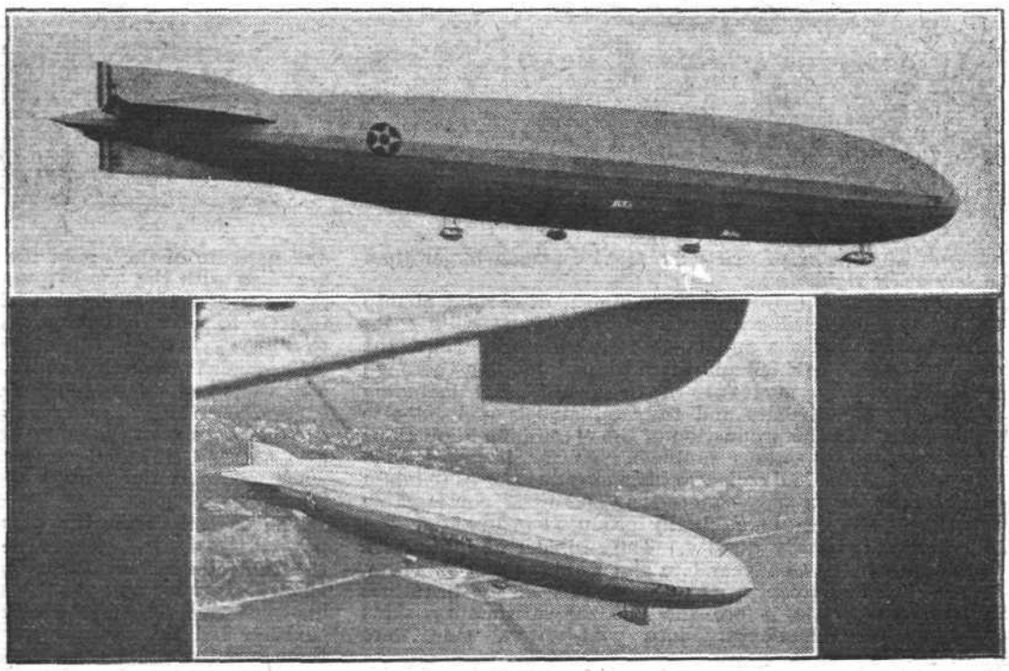
A duralumin ladder extends from the control car into the bottom of the hull, giving access *via* the " cat-walk " and similar ladders to the other cars. The ladder in the front car has a windshield forward, with canvas sides laced to a point aft, but the ladders from the other cars are unshielded. The rear portion of the control compartment is partitioned off to form a " padded cell " for the wireless operator and his gear. The engine compartment, which is at the extreme rear, is really separate from the control or front half, being joined thereto only by a flexible connection. The engine in the front car—and also that in the rear car—drives a 12-ft. propeller at a 50 per cent. reduction, the maximum engine speed being 1,400 r.p.m. The engines in the two cars amidships drive their 18-ft. propellers direct, whilst those in the next two cars are both geared and reversed. Except for the two starboard engines, which turn in a left-hand direction, the engines turn right-handed. A small four-cylinder rotary sleeve-valve engine (Kinney Manufacturing Co.) located in the forward engine car is employed to drive the generator supplying the electric current for the wireless equipment, etc. All six engines are fitted with a clutch for disconnecting the propeller, and the latter is also provided with a brake for stopping its rotation when freed.

In the forward car the engine radiator is mounted within the engine compartment, air being taken through a duct or scoop leading from the roof of the car to the radiator, a shutter in this scoop regulating the air flow and therefore the temperature of the cooling water. The radiators in the other five cars are mounted in openings in the nose of each car, and, of course, air scoops are not required. The exhaust manifolds of the engines are air-jacketed, as in usual Zeppelin practice.

The side and rearmost cars are of much the same design and construction, being similar to the rear or engine portion



THE FIRST AMERICAN-BUILT RIGID, Z.R.1 : On the left, an interior view of the control cabin, with Comdr. F. R. McCrary at the helm. On the right, an exterior view of the complete forward and control car.



Two views of the U.S. Navy Rigid, Z.R.1, in flight.

of the front car. All are provided with sliding, celluloid-glazed windows and are covered with duralumin sheet.

Fuel is carried, as usual, in 48 duralumin tanks conveniently located along the keel or "cat-walk." Each has a capacity of 113 gals., and some are so mounted as to be dropped from the ship when, in an emergency, it is required to lighten the ship.

Helium being, in comparison with hydrogen, an extremely valuable item, the gas valves are only opened if the ship cannot be manœuvred by any other means. The valves are, however, arranged to open automatically should the gas pressure become excessive.

The power equipment of Z.R.1 provides an estimated cruising range of about 4,500 miles, with four of the six engines turning at half speed, when the speed of the ship would be 40-50 m.p.h.; with all six engines running at maximum revolutions per minute the speed is approximately 80 m.p.h.

There is no room for luxury in the Z.R.1, and living accommodations for the officers have not yet been installed, but they probably will be forward. Quarters for the crew are amidships in the "cat-walk"—a platform of light boards about 25 ft. square, carrying bunks, being laid on the keel. A mooring-mast attachment is mounted in the nose of the ship.

Turning now to the actual flights of Z.R.1, the first of these, lasting about one hour, was made at Lakehurst on September 4, and was highly successful, every feature of the ship functioning perfectly. The airship left its shed at 5.45 p.m., and after flying to a point about 20 miles from the station returned, in the dusk, at 6.45. The ship did not attempt to make any high speeds—not going above 35 m.p.h.—neither was any effort made to gain an altitude greater than about 1,100 ft. One of the outstanding features of the flight was the demonstration of the ease of handling at low speeds. Capt. Heinen, the German pilot assisting in operations, said that he had never flown "a stronger ship." Heinen is credited with having tested 75 Zeppelins during the War.

A handling crew of about 450 men took the ship out of the shed and docked it on its return, which manœuvres were carried out without a hitch—a remarkable performance considering that they had never handled a rigid airship before. The crew for this flight consisted of about 30 men, entirely of working members, no one being carried who did not have specific duties for which he was qualified. On board in command were Capt. F. R. McCrary, U.S.N., Comdr. R. D. Weyerbacher, U.S.N., and Capt. A. Heinen.

Since her maiden flight, referred to above, Z.R.1 has made several other successful trips. A short flight was effected on September 6, when a speed of 50 m.p.h. was attained. This was followed on September 10 by a third ascent, when she remained aloft for one and a half hours. On September 11 she made her first extended tour, covering about 600 miles in 11½ hours. During this trip she flew over three States—New York, New Jersey and Pennsylvania. She left Lakehurst at 7.20 a.m. and headed for the New Jersey shore. Before proceeding to New York City a series of manœuvres were carried out, including a climb to 7,000 ft., valve testing, turning and speed tests up to 50 knots. Following these tests Z.R.1 flew to New York City, which was reached at about 11.30 a.m., where, escorted by three D.H. biplanes, she saluted the Statue of Liberty. After cruising round about for a time she proceeded to Philadelphia, arriving there at about 2.30 p.m., and then turned for home. Lakehurst was reached at 7 p.m.

On October 1 a much more ambitious flight was started. Carrying a crew of 42, the Z.R.1 left Lakehurst at 6.59 a.m. and headed for Pennsylvania against a 35 m.p.h. wind. At first she flew at an altitude of 1,500 ft., but later this was increased to 3,000 to 4,000 ft. in order to cross the Pennsylvania mountains. Still under unfavourable weather conditions the Z.R.1 passed over Philadelphia, Reading and Harrisburg, but it was not until Pittsburg was reached that the weather conditions improved. She then flew over Zanesville, Springfield and Dayton, reaching the latter at 7.48 p.m. (central time) with the McCook Field searchlights playing on her silver hull. After flying over Cincinnati some 90 minutes later, Z.R.1 made a section of Kentucky, round about Louisville. At 11.45 p.m. Boonville, Ind., was reached, and this being the home town of Comdr. Weyerbacher, messages and a bouquet of dahlias were dropped overboard in a parachute.

By midnight conditions were ideal as they passed over Evansville, making 40 knots with the motors at half-speed. Hereafter the speed increased considerably, so much so that they had to slacken off a little in order not to reach St. Louis before time. St. Louis, veiled in mist, was reached at 3.30 a.m., and after cruising around the Z.R.1 landed safely at the air-port at 7.45 a.m. Held down by some 120 men, the Z.R.1 remained at St. Louis until 9.40 a.m., when once again she rose into the air and started on her homeward journey. After skirting the city to the north-west and following the Mississippi River, she turned southward and cruised about at slow speed before turning towards home. The return trip, aided by favourable winds, was made at a much better speed, Lakehurst being reached and a landing effected at 6 a.m. on October 3. The Z.R.1 was thus in the air for 47 hrs. 49 mins., during which time she covered about 2,200 miles.

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THE GOODYEAR-ZEPPELIN AIRSHIP DEAL

PARTICULARS have just come to hand of an important airship deal that has recently been completed by the Goodyear Tire and Rubber Company of Akron, Ohio—one of the leading firms in America producing airships and balloons—whereby this company has acquired from the Zeppelin Company, of Friedrichshafen, Germany, all the airship manufacturing rights of the German company.

The Goodyear Company announces that a new company, subsidiary to the present one, will shortly be organised for the purpose of manufacturing lighter-than-air craft and all requirements of that branch of aviation. The new company will be managed and controlled by Goodyear, and the Zeppelin interests will receive a minority interest in the company in exchange for their patent rights and the services of their technical staff. No payment of cash has been made by Goodyear to the Zeppelin Company, and no cash consideration is involved in the acquisition of patent rights, the sole compensation to the Zeppelin Company being the minority interest assuring them an equitable share in the results of the business.

Under the Treaty of Versailles it is impossible to continue either the construction or commercial exploitation of airships in Germany, and the negotiations just concluded make it possible to transfer to America all the benefits and experience attained by the Zeppelin Company during twenty-five years of experiment and research. It may be of interest to note here that from 1900 to 1919 the Zeppelin Company constructed no fewer than 115 airships, both commercial and military. At the end of this period the Zeppelin construction and operating companies in Germany employed some 1,600 executives and engineers and about 12,000 workmen. Since the Armistice the construction of airships in Germany has practically ceased, and the plans for a two-and-a-half-day trans-Atlantic service have not materialised. With the construction of Zeppelins in America, however, together with American capital and enterprise, this trans-Atlantic scheme will in all probability be revived.

The Zeppelin engineers have evolved five types of rigid airships, capable of carrying great loads of freight, fuel for long-distance flights, and from 30 to 100 passengers, at a speed of from 60-90 m.p.h. Designs have also been produced for airships for scouting, mine-spotting, long, and short patrol work. All these designs are now available for development by the Goodyear Company.

It is understood that the arrangement just consummated assures to Goodyear exclusive rights in the United States and Canada only, so that it does not preclude formation of similar arrangements elsewhere. As soon as final negotiations are completed, a corps of experienced Zeppelin designers and builders from Friedrichshafen will start work at Akron in preparation for a "big push" in the development of American aeronautics. Wake up, England!

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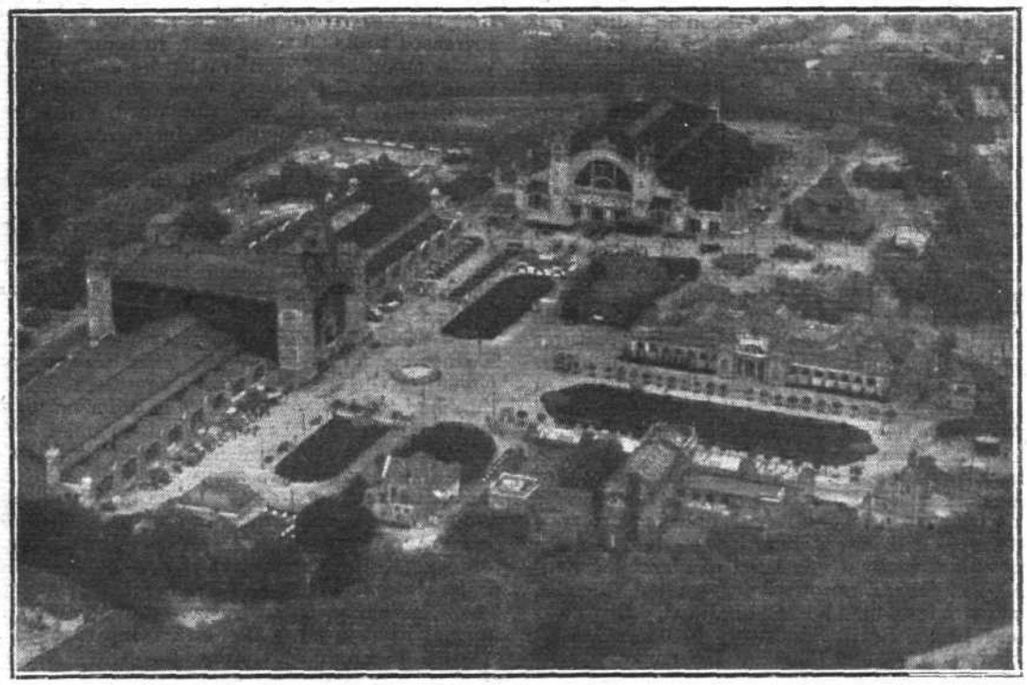
Seaplane Squadron No. 8, R.N.A.S. (G.E.A., 1916-18.)

THE fourth Annual Reunion and Dinner will be held at Gatti's Restaurant, 436, Strand (opposite Charing Cross Station), on Friday, December 7, at 7.15 sharp—Group Captain F. W. Bowhill, C.M.G., D.S.O., R.A.F., in the chair. Mufti. All officers and men of previous expeditions of R.N.A.S. in East Africa cordially invited. Tickets, 8s. All intending to be present should write immediately to Captain C. S. Thompson, 25, Wharncliffe Gardens, St. John's Wood, London, N.W. 8.

THE THIRD INTERNATIONAL AERO EXHIBITION, PRAGUE, 1924

THE great success which attended the second International Aero Exhibition, held at Prague in 1921, has encouraged the Czecho-Slovak Aero Club to make this an annual event. It has been arranged, therefore, to hold the third Aero Exhibition, in the Palace of Industry, Prague, from May 31 to June 9, 1924. The exhibition will be under the patronage of Dr. T. G. Masaryk, President of the Czecho-Slovak Republic, and will comprise aeroplanes, airships, balloons, and engines, together with component parts and materials for their construction, whilst there will also be sections devoted to tools and other articles used in aircraft manufacture, and to air transport in its various branches. In addition to the various Czecho-Slovakian aircraft firms—of which there are now several highly-successful establishments, designing and constructing some really excellent machines—it is expected that a number of foreign firms will also be represented. Czecho-Slovakia has taken up aviation very seriously, and has already found a place amongst the foremost aircraft building and designing nations of the world. Any further information regarding the above exhibition may be obtained from the Czecho-Slovak Aero Club, Praha II, Vodičkova 41, Palace Česká Banka, Czecho-Slovakia.



Prague Exhibition, 1924 : The Palace of Czecho-Slovakian Industry, where the Third Aero Exhibition will be held.

The Czecho-Slovakia Government aerodrome, one of the finest in Europe, measuring 1,600 by 1,000 yards, also the civil station of Continental air services from London, Cologne, Paris, Warsaw, Budapest, Bucarest, Bratislava, and Vienna.

PRAGUE AERO EXHIBITION, 1924.

FLIGHT

LIGHT 'PLANE AND GLIDER NOTES

WE are glad to learn that considerable progress is being made with the planning and drafting of the rules that are to govern next year's competitions for light aeroplane two-seaters. A good many bodies and institutions have to be consulted, and the views and requirements of all co-ordinated in such a way as to ensure, as far as possible, the success of the competitions. This naturally involves a great deal of work, and takes up considerable time, but we are informed that things are moving along satisfactorily, and that already the general character of the meeting has been decided upon and accepted in principle. At the moment we are not at liberty to disclose details, but we may state that the machines will have to be dual-control two-seaters, with engines of not more than 1,100 c.c. capacity. Presumably, a condition of the acceptance of a machine for the trials will be that it must be capable of being flown, and be in proper trim, either with or without a passenger.

* * *

WHAT has been aimed at in framing the rules is to preclude, as far as is humanly possible, the chance of a "freak" machine winning the competition. The performances required are such that any machine that succeeds in getting through them all, and in standing up to the work for the whole of the meeting, will have definitely proved itself a thoroughly sound proposition. At the same time it is hoped that the rules will ensure that, for instance, a firm backed by ample capital and able to enter several machines, will not stand a disproportionately greater chance of winning than will a single machine designed, built, and entered by a small firm, or even by a private individual. Reliability, general handiness, stability, and manœuvrability are the features aimed at, and extreme economy will not, next year, be the primary object, although competing machines will be required to show that they can cover a reasonable distance on a given amount of fuel. It is hoped that it will soon be possible to give details of the rules and regulations.

* * *

ONE of the light aeroplanes which competed at Lympne in October is, we understand, being fitted with smaller wings, and a really fine turn of speed is expected to result, although the landing speed will not be such as to cause any anxiety to an experienced pilot.

MR. J. G. NAVARRO, who will be remembered by many of our readers from the War-time period, has asked us to announce in these notes that he is hoping to form a light 'plane and glider association in the London district, one object of the association being to provide facilities for its members for short week-end flights into the country or to the seaside. If a sufficient number of members are interested, it is thought possible that construction on a small scale may be undertaken, either to the designs of Mr. Navarro or to suit the ideas and requirements of members, all the work to be carried out under thorough supervision and inspection. If there is sufficient response it is intended to make quite a small start by getting a hangar at one of the aerodromes in the London district, and to have a corner partitioned off as a clubroom, where members can gather for a smoke and a chat.

* * *

MR. NAVARRO has been associated with aviation since the very early days, and before the War he was connected with the British Breguet firm. Early in the War he joined the Brush Electric Company at Loughborough, who were at that time, we believe, building Maurice Farmans. From there he emigrated to Southampton, where he joined Mr. Pemberton Billing. Later on he was on the designing staff of Whitehead's at Richmond, and finally he formed the Navarro Aircraft Company at Burton-on-Trent, where sub-contracts were carried out. Mr. Navarro has thus had varied experience of aviation, and his advice on technical matters in connection with the proposed association will be readily given. Anyone interested in the formation of such a club is advised to write to Mr. J. G. Navarro direct, at 18, Staunton Road, Kingston-on-Thames.

* * *

MR. E. T. W. ADDYMAN asks that those interested in the formation of a light 'plane club in Harrogate and district will communicate with him at "The White House," Starbeck, Harrogate.

* * *

A MONOPLANE glider has been designed and built by Mr. H. J. Nordman, of Flushing, New York, and was tested recently at Mitchel Field, Long Island. The method of testing was to tow the machine behind a motor-cycle on a 200-ft. length of rope. The tests were successful.

THE CARLEY LIGHT 'PLANE

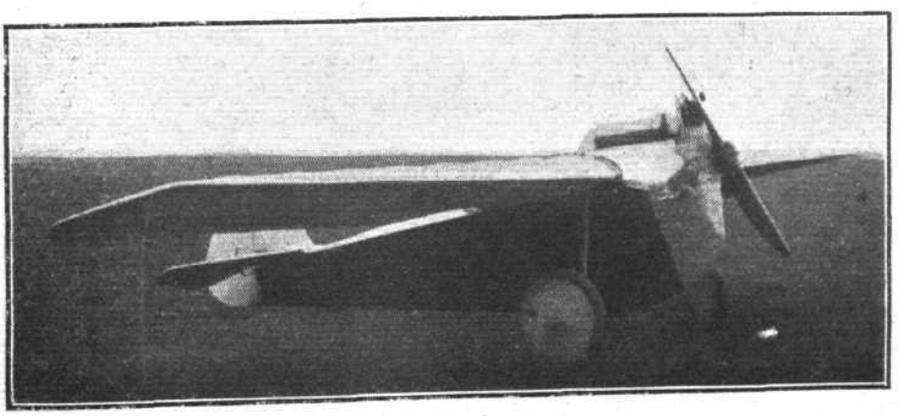
20 H.P. Anzani Engine

[IN our issue of November 15, 1923, we referred briefly to the first Dutch light 'plane, the Carley monoplane, which was put through its preliminary flying tests at Waalhaven, Rotterdam, recently. A correspondent in Holland now sends us the following particulars, photographs, sketches, and scale drawings, from which a very good idea of the Carley monoplane can be formed.—ED.]

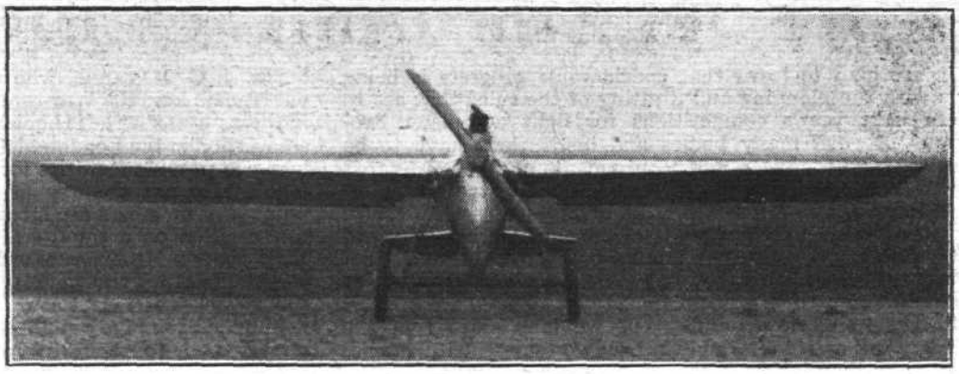
About six months ago Mr. J. D. Carley, a well-known Dutch pilot and designer, commenced work on a tiny aeroplane. He very carefully studied the engine-capacity question, and first an Indian "Super Chief" engine of 10 h.p. was fitted, but did not give satisfactory results. A French Sergant air-cooled four-cylinder engine of 12 h.p. behaved like the Indian, and stopped more than once whilst in flight.

Mr. Carley then came to the conclusion that motor-cycle engines never would make possible safe cross-country flying, and decided to fit a small, but real aero engine, the Anzani three-cylinder of 20-22 h.p.

The results were amazing. The little 'bus flew at Waalhaven aerodrome (Rotterdam) in extremely bad weather, piloted by Mr. Raparlier, a Belgian War-pilot, who was very enthusiastic about its behaviour, the ready answering of the machine to its controls, the easy starting and landing, and the speed. A few days later a flight was made from Waalhaven to Scheveningen, near the Hague, in 16 minutes. There the wing was taken from the fuselage, and the machine transported through the streets of the Hague to the works at Voorburg, where we have made the accompanying sketches.



The Carley light monoplane: Three-quarter front view.



The Carley light monoplane: Front view. Note triangular - section fuselage.

From the photographs will be seen that the Carley light 'plane is a cantilever monoplane of very clean lines, the thick tapering wing being placed on the fuselage. The machine is painted in Mr. Carley's favourite colours—*i.e.*, a red fuselage and yellow wing and tail planes.

The fuselage is a wooden structure of triangular section. It consists of three longerons of plain solid section, and of a number of bulkheads glued together and covered with three-ply. There are no metal fittings or wires in the whole fuselage.

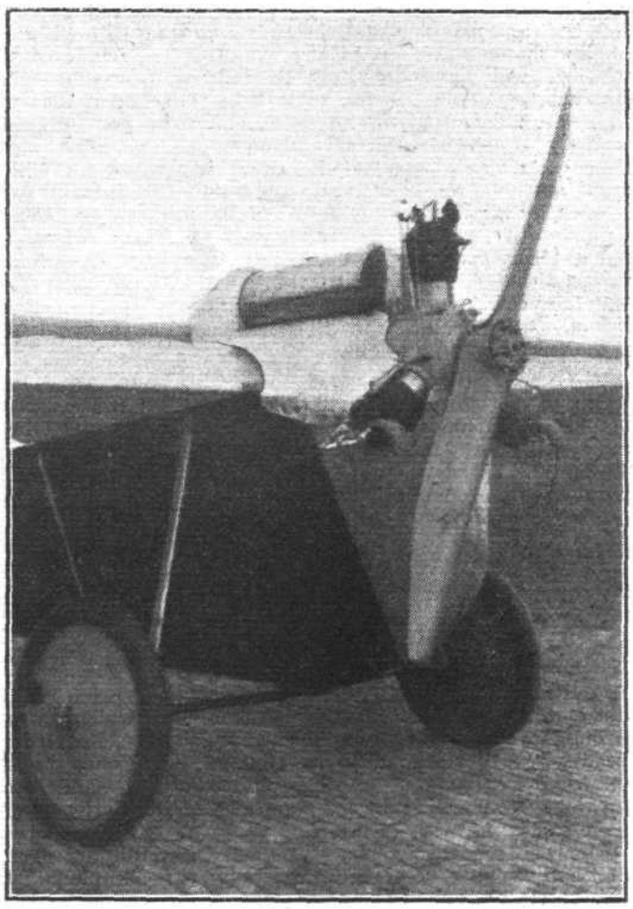
The wing is a tapering cantilever of very deep section. It is entirely constructed of wood. The ribs consist of a thin three-ply web, with strips glued and nailed to the sides acting as flanges. There are two box spars. The wing is covered up to the front spar with three-ply, aft of the front spar to the trailing edge with fabric. There are no bracing wires. Ailerons of ample proportion are fitted, and each aileron is connected with the wing by three hinges. These hinges are of very simple construction, as shown in one of our sketches. In the thick centre of the wing is a circular cut-out portion, which forms a part of the pilot's cockpit. As the fuselage is triangular, the pilot's seat is rather high, and thus a very good view is obtained. The controls are of the usual type: joy-stick and rudder bar. One of the sketches shows how the rudder bar is supported. The tail planes are of standard type, of cheap, simple, but strong construction. The horizontal tail plane is fitted to the fuselage by a U-bolt on each side.

The elevator is in one piece. The cables operating the elevator are carried over pieces of aluminium in order to prevent damage to the fabric.

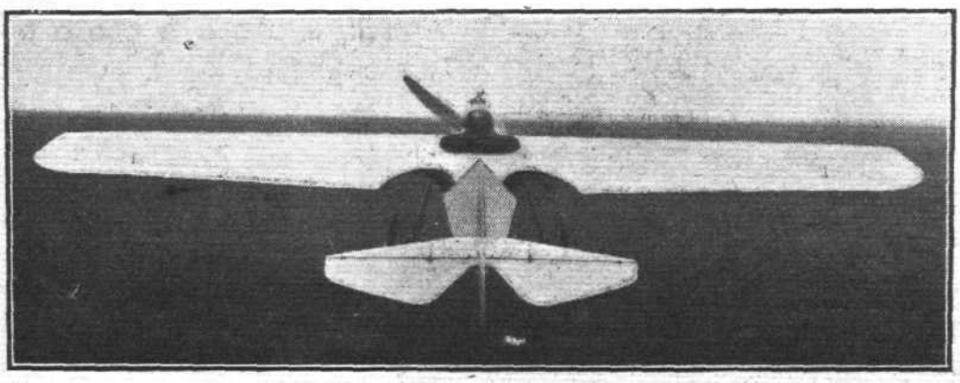
The undercarriage is of the divided type, and hinged to the fuselage where the lower longeron forms the keel. The axle is provided with a wooden streamline fairing, and rests in a cut-out of the V of streamlined steel tubes which runs from the upper longeron to the end of the axle, which is sprung by rubber cords. The ends of the V are fitted to the fuselage by a triangular steel box, where a bolt goes through the eye in the streamline tube. To the same box is fitted a U-bolt which connects the wing to the fuselage, as may be seen in the illustration.

The tail-skid is fitted to the rudder, in order to facilitate steering when taxying over the ground. It is made of a steel spring, one end being wound over a piece of steel tube and then bent straight, the other end being wound right down. There the ends meet and are welded to a steel plate.

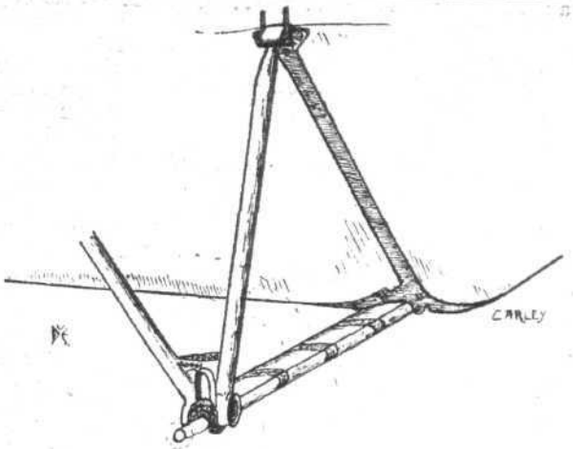
The Anzani engine is mounted on a steel ring, and drives a Pierre Levasseur propeller of 1·70 m. (5 ft. 7 ins.) diameter. Direct aft of the engine is fitted the petrol tank, with a capacity of 3½ hours The feed of the carburettor is by gravity. A windscreen is in front of the cockpit.

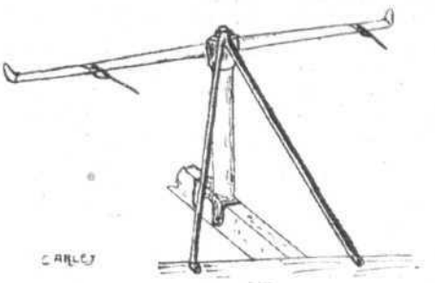


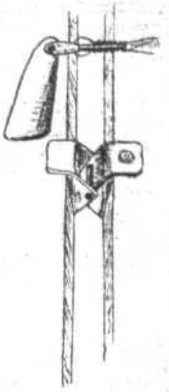
THE CARLEY LIGHT MONOPLANE: View of undercarriage, engine mounting, etc.



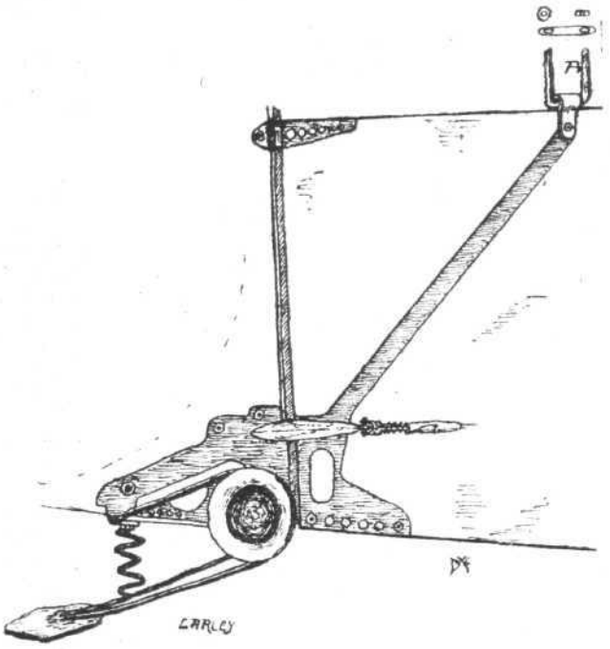
The Carley light monoplane: Rear view. Note cut-outs in trailing edge.

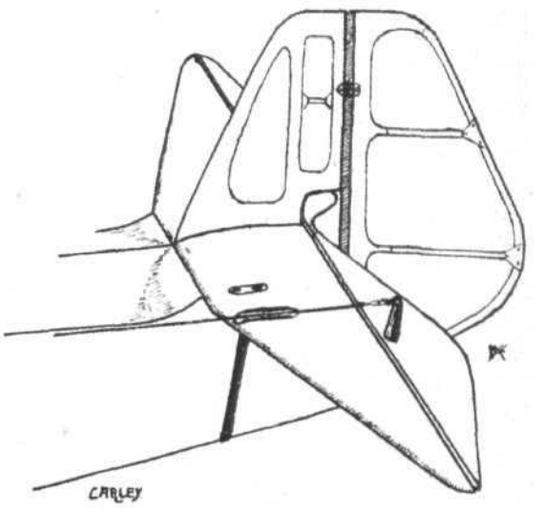




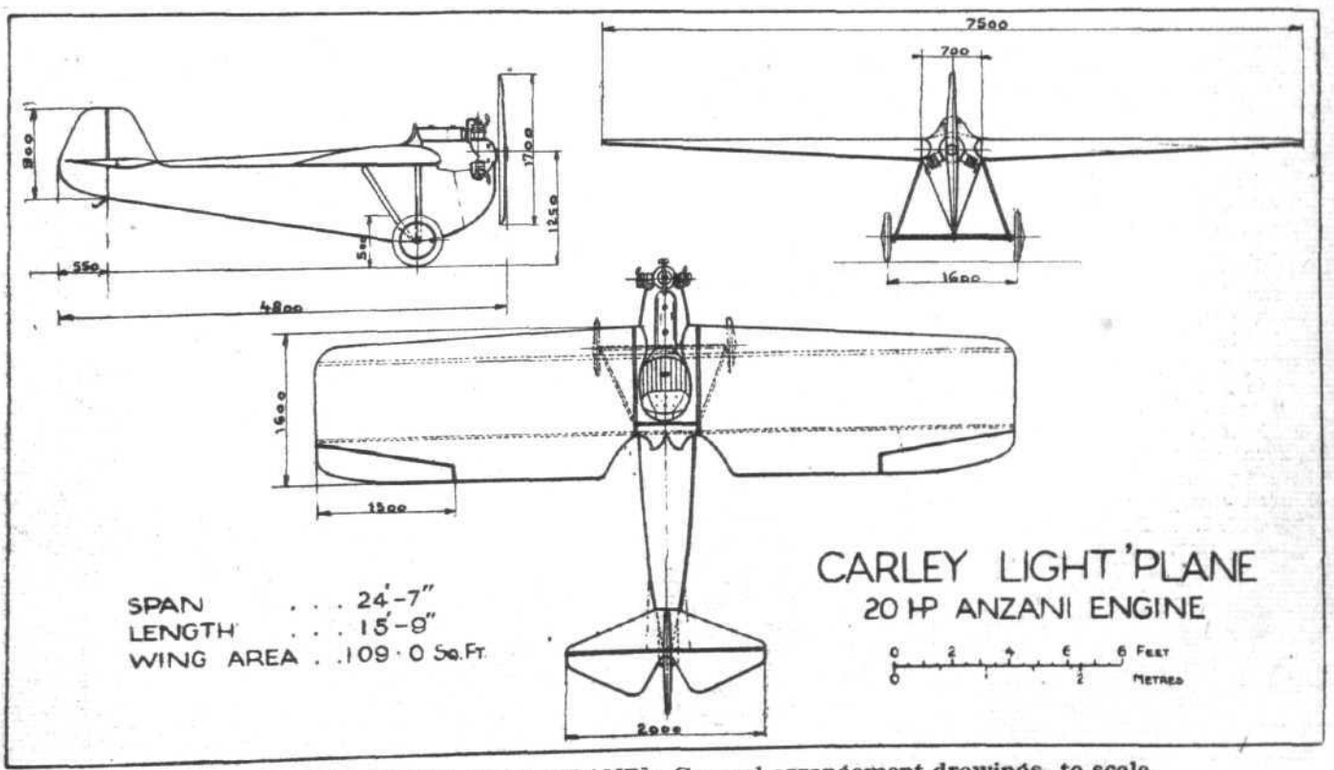


THE CARLEY LIGHT MONOPLANE: On the left, a sketch of one side of the undercarriage. The wheel has been omitted for the sake of clearness. On the right, the mounting of the rudder bar, and the very simple hinge used for elevator and ailerons.





THE CARLEY LIGHT MONOPLANE: On the right, a sketch of the tail unit: and on the left details of the tail, skid, which is mounted below, and turns with, the rudder.



THE CARLEY LIGHT MONOPLANE: General arrangement drawings, to scale.

All the main dimensions of the Carley motor-bike of the air are shown in the accompanying general arrangement drawings. The characteristics are :—

Weight empty	135 kgs.	300 lbs.	
Pilot	75 ,,	167 ,,	
Petrol and oil for 3½ hours' flying	15 ,,	33 ,,	
Weight fully loaded	225 ,,	500 ,,	
Load per h.p.	10 ,,	22 ,,	
Load per m.²	19 ,,	3·9 lbs./sq. ft.	
Maximum speed	140 km.	87.5 m.p.h.	
Minimum speed	35 ,,	44 ,,	

Messrs. Carley Aeroplanes intend to take part in the light 'plane competitions for the 100,000 francs prize of *L'Aero Sports*, by making a non-stop flight from Waalhaven to Paris.

Now they are building a two-seater light 'plane for school purposes. It is a braced biplane and is to be fitted with a 20 h.p. Anzani engine. It is not yet permitted to give details, but we hope to give them in the course of a few weeks.

MIJNHEER FOKKER'S LECTURE TOMORROW

WE would remind our readers that it is tomorrow, November 30, that Mijnheer Fokker will read, before the Institution of Aeronautical Engineers, his paper on "The result of twelve years' welded tube construction, and the development of cantilever wings." The paper will be read at the Royal Society of Arts, John Street, Adelphi, and will commence at 7.30 p.m. Readers of FLIGHT may be assumed to be familiar with the work of the famous Dutch aircraft designer, whose services were secured by the Germans a year or two before the outbreak of war, and whose machines were, once upon a time, a serious menace to Allied air supremacy on the Western Front. In fairness to Fokker it should be pointed out that he had offered his services to the British Government before he went to Germany, and that had the authorities of 1913 or 1912 decided to encourage the young Dutch inventor to come over here there is a very good possibility that the name Fokker might have been as closely associated with the Allies as it later became allied to German military aviation.

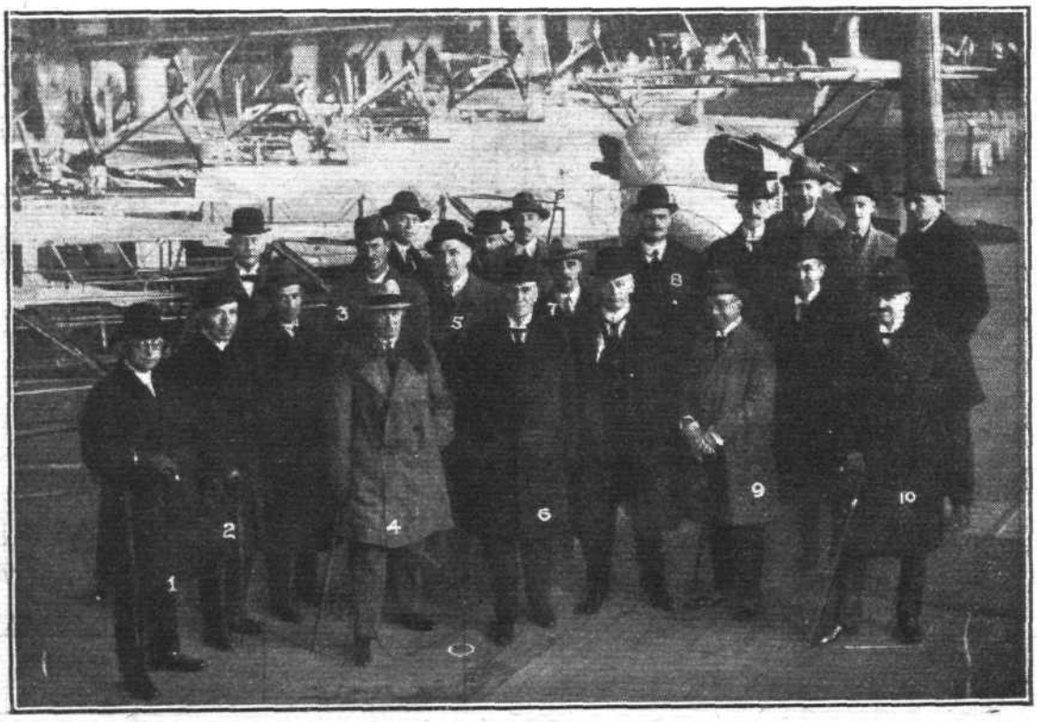
It is, of course, well known that Fokker has done more than perhaps any other single designer to develop and popularise the cantilever wing machine. Almost without exception the Fokker aeroplanes of the last five or six years have been of the cantilever type, sometimes monoplanes and sometimes biplanes, but always with wings without external bracing. Fokker did not lightly arrive at the development which resulted in the adoption of the cantilever wing, and when he first attempted to introduce it he met with very considerable opposition. The small Fokker triplane with Oberursel rotary engine was the first cantilever wing machine to be adopted by the German Air Force, and it must be admitted that at one time this machine was considered by German pilots to be dangerous. Whether or not this opinion was justified does not greatly matter at the moment. What does matter is that from the Fokker triplane dates the beginning of the practical development of the cantilever wing, and in his paper Fokker will give an outline of the difficulties with which he met, the methods he adopted for overcoming them, and the latest test results indicating the strength of the Fokker type of cantilever wing.

On the subject of welded tube construction, Fokker's paper should be, if anything, even more interesting. This form of construction is entirely taboo in this country, although Fokker has employed it with success ever since his first automatically stable monoplane of 1911 or thereabouts. The objections raised to welded tube construction are that a defective weld cannot be discovered until it fails under load, and that welding requires very skilled workmen. We believe that Fokker's paper will answer both criticisms pretty conclusively, and will show that practical experience has not borne out the theoretical objections, and that, as a matter of fact, the welded tube construction used in so many Fokker machines during the War was mainly carried out by unskilled labour, even by women. The paper cannot fail to be of more than usual interest, and as a very few tickets are still available we should advise those interested to communicate with Mr. L. Howard Flanders, Hon. Sec., I.Ae.E., 60, Chancery Lane, London, W.C. 2.

Reduced Air Mail Fee to Iraq.

THE Postmaster-General announces that the special fee payable, in addition to ordinary postage, on letters for Iraq and Northern and Western Persia, intended for onward transmission from Egypt by the fortnightly Cairo-Baghdad air service, has been reduced to 3*d*. for each oz. or part of an oz.

Letters intended for transmission by the air route must bear the official blue Air Mail label, or be plainly marked in manuscript "By Air Mail."



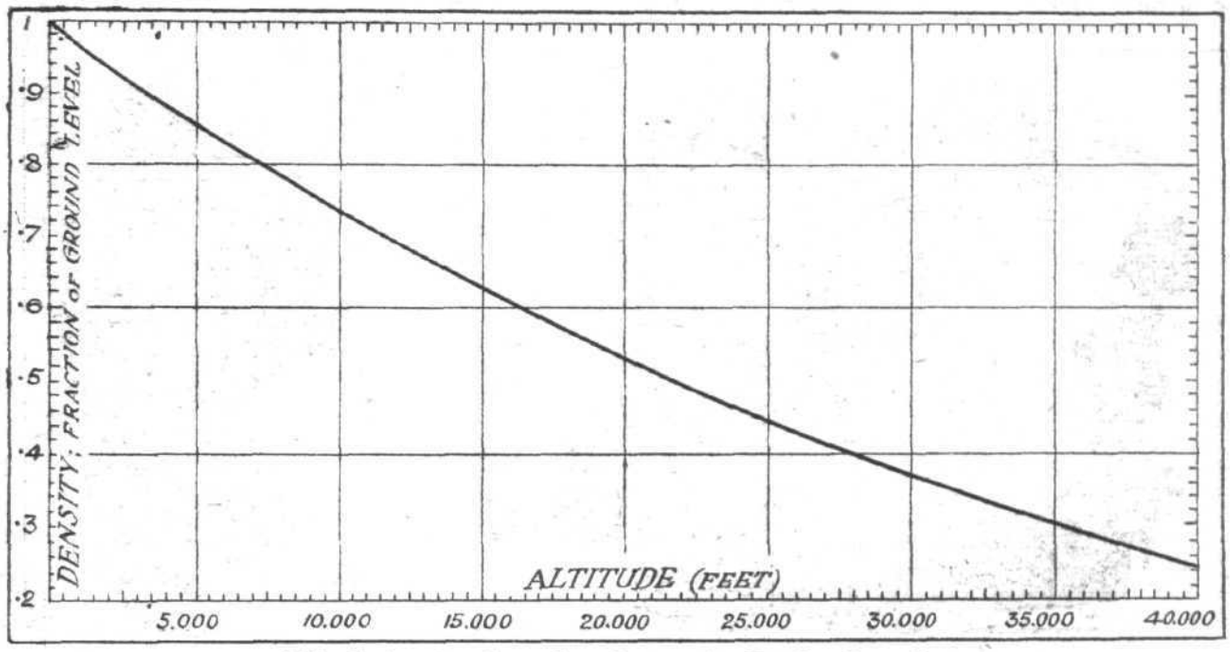
The International Air Traffic Conference at the Hague: This Conference was called to discuss air traffic between England and the Scandinavian countries, being attended by aviation and post office representatives of England, Holland, Germany, Denmark, Norway, and Sweden. Our photograph shows a group of delegates on a visit to the Fokker works at Amsterdam, where some of the latest products of this Dutch designer were inspected. In the group are, among others: 1. Herr Moraht (Germany), 2. Kapten von der Lippe (Norway), 3. General Festing (England), 4. Mijnheer Fokker, 5. Mr. Willy Wulff (Denmark), 6. Post Director Juhlin (Sweden), 7. Mijnheer van Heemstede (Holland), 8. General Williamson (England), 9. Herr Thilo (Germany), and 10. Colonel Amundson (Sweden).

A CONVENIENT FORMULA FOR ALTITUDE PERFORMANCE ESTIMATES

MR. W. S. SHACKLETON, designer of the A.N.E.C. light aeroplanes, has very kindly sent us the following density formula, which has been deduced by Professor Knoller of the Technical University of Vienna, and which has not, as far as we are aware, been published, at any rate in this country. The formula has the merit of great simplicity, being: Density at an altitude of H kilometres $= \frac{20 - H}{20 + H}$: the simplicity of the Knoller formula may be the better appreciated when it is remembered that the French official formula is $\left(\frac{288 - 0{\cdot}0065H}{288}\right)^{4{\cdot}256}$ where H is the altitude in metres.

Nevertheless, the results given are in very close agreement with those obtained by the more complicated formula, as the following example will show: Density at 5 kilometres (5,000 metres) $= \frac{20 - 5}{20 + 5} = \frac{15}{25} = 0{\cdot}6$ of sea level density.

Using the French formula the calculation becomes: Density at 5,000 metres $= \left(\frac{288 - 0{\cdot}0065 \times 5{,}000}{288}\right)^{4{\cdot}256} = 0{\cdot}887^{4{\cdot}256} = 0{\cdot}601$. It will thus be seen that the accuracy appears to be all that is required for practical performance estimates. Mr. Shackleton informs us that very accurate results are obtained up to an altitude of 12 km. (7½ miles), a height which is well above the ceiling of most machines, although Sadi Lecointe has reached 11,145 m. (6·9 miles) on his Nieuport-Delage.



Altitude-density chart, based upon the Knoller formula.

If it is desired to use British units, with the altitude expressed in feet, the Knoller formula becomes: $\frac{65616 - H}{65616 + H}$; for example, the density at 20,000 ft. is $\frac{65616 - 20{,}000}{65616 + 20{,}000} = \frac{45616}{85616} = 0{\cdot}533$ of the density at ground level. Using the Knoller formula, we have prepared the accompanying graph, from which densities can be read off directly up to an altitude of 40,000 ft.

◈ ◈ ◈ ◈

NOTICES TO AIRMEN

NOTICE No. 91 of 1923 just issued refers to Aerodromes, etc., in France and gives full particulars of signals and markings, etc., by day and night, position, accommodation, etc. The aerodromes specifically mentioned are: Le Bourget, St. Inglevert, Montélimar, Agen, Nîmes, Villeneuve-Orly, and Avignon-Pujaut.

Navigation and Meteorology Lectures for Pilots

A SERIES of 12 lectures on navigation, based on the syllabus of the examination for 4th Class Navigators, will be given at Croydon aerodrome, commencing on December 3 and continuing for 12 weeks, excluding Christmas week.

By arrangement with Daimler Hire, Ltd., the lectures to be given by a representative of the Air Ministry will be co-ordinated with a similar series to be delivered by the navigating officer of that company.

Concurrently, a series of 12 lectures on meteorology will be given.

Each lecture will be given twice in one week to enable pilots to fit in the full course with other arrangements. Navigation lectures will be given on Mondays and Thursdays and meteorology lectures on Tuesdays and Fridays. The programme for the first week will therefore be as follows:—

Monday, Dec. 3.—No. 1 Navigation lecture.
Tuesday, ,, 4.—No. 1 Meteorology lecture.
Thursday, ,, 6.—No. 1 Navigation lecture (repeated).
Friday, ,, 7.—No. 1 Meteorology lecture (repeated).

The succeeding lectures will be given similarly on the same days in subsequent weeks. The lectures will commence at 4.0 p.m.

Pilots who propose attending these lectures will assist—and may obtain further information—by communicating with the Secretary, Air Ministry, Kingsway, W.C. 2 (telephone Regent 8000, Ext. 348), in the case of navigation lectures, and with the Meteorological Officer at Croydon aerodrome, in the case of meteorology lectures.

(No. 98 of 1923.)

France: Aerodromes, Etc.

No. 99 of 1923, just issued, gives details of the landing-ground, situation, accommodation, signals and markings, etc., of the following aerodromes:—

St. Dizier, Toulouse and Scarrebourg.

NOTICE TO GROUND ENGINEERS

Maintenance of A.V.8 and A.V.12 Type Magnetos: Amendment

1. THE following amendments are made to Notice to Ground Engineers No. 1 of 1922:—

Paragraph 3—Distributors.

Page 2, line 3. For "limits of ·010" and ·015"," read "limits of ·018" and ·022"."

Page 2, line 7. For "between ·020" and ·030"," read "between ·025" and ·030"."

2. The amendments should be noted on existing copies of the Notice in question, and will be incorporated in the reprinted copies which will be issued, as required in future.

(No. 5 of 1923.)

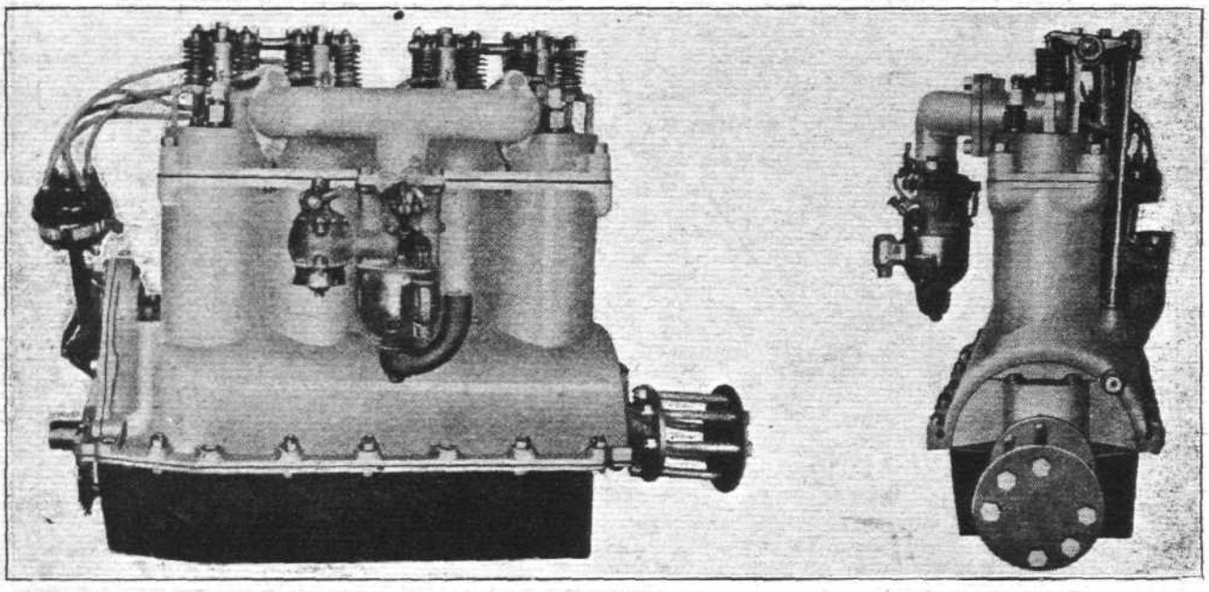
THE ROGERS B.4 AIR-COOLED ENGINE

THE accompanying illustration shows a four-cycle four-cylinder air-cooled engine produced by the Rogers Aircraft Co., of Fort Worth, Texas, U.S.A., developing 45 h.p. In designing the "B.4," as it is called, the makers have aimed at producing, at low cost, a durable and efficient light-weight power plant suitable for use on a sport 'plane, ice-sled or "air-car," and one with which inexpensive replacement parts are readily available.

Direct cooling is achieved in this engine without projecting fins, the valve springs, rocker arms, valve stems, valve cages and rocker-arm parts being designed to give additional surface to carry off the surplus heat. The manufacturers to be 40 per cent. lighter than aluminium, having at the same time exceptional wearing qualities. The physical characteristics of this metal are: Specific gravity, 1·85; elastic limit, 14,000 lbs. per sq. in.; tensile strength, 22–24,000 lbs. per sq. in.; melting-point, 1,100° F. The piston, complete with bushings, weighs 14 ozs.

Strong, light and durable cylinders have been obtained by employing the finest grey iron, which metal is also used for the cylinder-heads. The intake is an aluminium casting, free from sharp bends and having an inside measurement of $1\frac{3}{8}$ in.

Lubrication is by splash, and a model "L" Schebler car-



Two views of the Rogers "B.4" air-cooled engine, a new light four-cylinder 45-50 h.p. motor of American origin.

claim that numerous tests have demonstrated that this engine cools perfectly in flight.

Both inlet and exhaust valves are carried in the cylinder-head, and the charge is thus led direct to the top of the piston, whilst the exhaust is forced out with minimum effort—there being, as may be seen from the illustration, no pockets or exhaust manifolds as in other types of engines.

The connecting rods are of 60/40 carbon steel, and in spite of the fact that they weigh only $1\frac{1}{4}$ lbs. each, are stated to be exceptionally strong. The pistons are of "Dowmetal," and are fitted with four rings, three compression and one wiper—the latter carrying oil back to the crank-case and preventing the fouling of the plugs. "Dowmetal" is claimed

burettor, adjustable to low, intermediate and high speed, provides a correct mixture for all requirements. Atwater-Kent battery ignition is used, two batteries being provided to ensure uninterrupted ignition should one battery fail.

The principal characteristics of the Rogers B.4 are:—

Horse-power	45-50.
Bore	$3\frac{13}{16}$ ins.
Stroke	4 ins.
Number of cylinders ..	4.
Weight of motor dry ..	140 lbs.
Weight per horse-power ..	2·8 lbs.
Petrol consumption	0·412 lb./h.p./hr.
Oil consumption	0·011 lb./h.p./hr.

Fokkers for Russia.

FROM Helsingfors in Finland it is reported, and confirmed in a message from Holland, that the Russian Government has just placed a large order for aircraft with the Fokker works of Amsterdam. The figure 500 is mentioned, and although this is probably somewhat exaggerated, there seems little doubt that the N.V. Nederlandsche Vliegtuigenfabriek has received a very large order. It is stated that a Russian Commission is now staying at the Schiphol aerodrome, where, out of every five machines, one is officially tested by the Russian representatives.

Roland Garros' Aeroplane Brought Back.

A FEW days ago the remains of the aeroplane on which M. Roland Garros, the famous French pilot, met his death on October 5, 1918, were brought back to Paris and placed in the Air Museum at Chalais-Meudon. The machine was escorted by a number of leading French aviation personalities, and the route was laid *via* the Arc de Triomphe, a halt being made at the tomb of the Unknown Warrior, and a minute's silence was observed.

Amundsen to Make Use of the "Shenandoah"?

FROM America it is reported that Mr. Roald Amundsen, whose attempt to fly from Nome, Alaska, to Spitzbergen, last summer failed, has been offered by the U.S. authorities the use of the Z.R.1, or, as she is now called, the "Shenandoah," for his proposed attempt next year. Amundsen is to use for his next effort Dornier all-metal flying boats of the type exhibited at Gothenburg, and if he accepts the offer of the loan of Z.R.1 the airship will probably be employed as a supply ship. It is expected that Amundsen will accept the offer.

PERSONALS

To be Married

The engagement is announced of Flight-Lieut. R. W. GORDON WEST, R.A.F., son of the late Rev. J. O. West and Mrs. West, Beacon's Hill, Lichfield, and ELISE, only child of Capt. H. N. GARNETT, C.M.G., R.N. (Retd.), and Mrs. GARNETT, "Qui qu'en Grogne," Dinard.

The engagement is announced between Flight-Lieut. F. G. C. WEARE, M.C., only son of Mr. and Mrs. F. Weare, of The Dell, Tunbridge Wells, and ELEANOR RACHEL, only daughter of Mr. and Mrs. H. D. CHERRY-DOWNES, of Southfield House, Newark-on-Trent.

Death

The death has occured from pneumonia of Flying Officer ABBOTT, R.A.F., of Henlow Aerodrome, near Hitchin. Flying Officer Abbott, who was 42 years of age, accompanied Captain Scott on his last expedition to the Antarctic. Military honours were accorded at the funeral at Northampton on November 26.

FLIGHT

THE ROYAL AIR FORCE

London Gazette, November 20, 1923

General Duties Branch

C. W. McK. Thompson is granted a short service commn. as a Flying Offr., with effect from, and with seny. of, Nov. 6. The following Pilot Offrs. are promoted to rank of Flying Offrs. :—A. F. Scroggs ; seny. Nov. 1, 1922. W. C. P. Bullock, N. C. O. Forbes ; May 1. J. B. Barrett, N. C. H. Hames, J. R. Brown, G. C. B. Bernard-Smith, F. G. S. Mitchell, W. A. D. Brook, R. A. B. Stone, E. V. S. Lacey, C. J. Stone ; June 20. G. C. Shepherd ; Aug. 27.

The short service commn. of Pilot Offr. J. A. Ryper is terminated on cessation of duty ; Nov. 17.

Stores Branch

The following Flight Lieuts. are transferred to Stores Branch from General Duties Branch :—R. A. Young ; April 30. R. F. Osborne ; Aug. 27.

Medical Branch

J. E. Cox is granted a temp. commn. as a Flight Lieut., with effect from, and with seny. of, Nov. 5.

Reserve of Air Force Officers

Class A.—C. St. C. Parsons is granted a commn. in General Duties Branch as Flying Offr. on probation ; Nov. 20. Flying Offr. E. G. H. C. Williams resigns his commn. ; Nov. 5. The following offrs. are confirmed in ranks, with effect from the dates indicated :—*Flying Offrs.*—A. R. Boeree, E. C. Dickens, F. Ellam ; Nov. 1. *Pilot Offrs.*—V. N. Dickinson, W. Harmston, J. E. Hunt, R. W. Jackson, G. A. Milbank, F. Neale, N. J. Nock, W. C. Osborn, W. R. Parkhouse, G. Richardson, R. A. Seaton, R. R. Spencer, M.M., D. L. Townsend, A. M. Verity, G. T. Witcombe ; Oct. 20. T. W. Campbell ; Oct. 21. J. Craig ; Nov. 6.

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the R.A.F. are notified:—

General Duties Branch

Air Commodore F. C. Halahan, C.M.G., C.B.E., D.S.O., M.V.O., to H.Q., Coastal Area. 13.11.23, for special duty.

Wing Commander D. A. Oliver, D.S.O., O.B.E., to Inland Area Aircraft Depot, Henlow, for administrative duties. 1.12.23.

Squadron Leaders : E. L. Conran, M.C., to R.A.F. Depot (non-effective pool). 4.11.23. T. F. Hazell, D.S.O., M.C., D.F.C., to No. 111 Sqdn., Duxford, to command. 1.12.23. A. S. C. Maclaren, O.B.E., M.C., D.F.C., A.F.C., to Marine and Armament Experimental Establ., Isle of Grain. 1.12.23. S. W. Smith, O.B.E., and J. Kemper, M.B.E., both to R.A.F. Depot on transfer to Home Estab. 13.10.23. W. G. Sitwell, D.S.C., and R. Hutton, both to R.A.F. Depot (non-effective pool) on transfer to Home Estab. 13.10.23. G. G. A. Williams, to No. 7 Group, H.Q., Andover, on transfer to Home Estab. 13.10.23.

Flight Lieutenants : R. S. Lucy, A.F.C., to No. 5 Flying Training Sch., Shotwick. 1.12.23. A. H. Beach, to R.A.F. Depot. 1.12.23, pending disposal on transfer to Home Estab. N. S. Douglas, F. J. Vincent, J. A. W. Binnie, G. Martyn, and A. H. Flower, all to R.A.F. Depot on transfer to Home Estab. 1.11.23.

Flight Lieutenants : The following officers all to R.A.F. Depot on transfer to Home Estab. 13.10.23 :—Hon. R. A. Cochrane, A.F.C., W. H. Park, M.C., D.F.C., G. A. H. Pidcock, E. G. Hilton, A.F.C., F. R. Wynne, M.B.E., and E. W. Nicholson. R. W. Chappell, M.C., to R.A.F. Depot (non-effective pool), on transfer to Home Estab. 13.10.23. C. H. C. Woollven, M.C., T. F. W. Thompson, C. R. Keary, H. P. Lloyd, M.C., D.F.C., C. F. Brewerton D.S.C., and C. J. S. Dearlove, all to R.A.F. Depot on transfer to Home Estab. 21.10.23.

Flying Officers : K. Loughlin, to Inland Area Aircraft Depot, Henlow. 1.12.23. (Hon. Flt. Lieut.) G. C. L. Dalley, to R.A.F. Base, Leuchars. 9.11.23. D. P. Hadow, to No. 19 Sqdn., Duxford. 14.11.23. H. A. Hamersley, M.C., and I. N. C. Clarke, D.S.C., both to Central Flying Sch., Upavon. 31.10.23. H. H. Down, A.F.C., to Central Flying Sch., Upavon. 26.11.23. R. S. Greenslade, A. F. Wynne, and J. B. L. H. Cordes, all to No. 5 Flying Training Sch., Shotwick. 19.11.23. S. L. H. Potter and E. A. Sullock, both to R.A.F. Cadet College, Cranwell. 19.11.23. R. C. B. Brading, D.F.C., to No. 19 Sqdn., Duxford. 19.11.23. F. W. Mundy, to R.A.F. Depot. 4.10.23, on appointment to a Short Service Commn. F. W. Mundy, to No. 7 Sqdn., Bircham Newton. 16.11.23. H. S. Broughall, M.C., G. Archer, and J. S. Harrison, all to No. 216 Sqdn., Egypt. 14.10.23. J. K. A. Jeakes, D.F.C., W. J. Millen, and J. T. A. Lochner, all to No. 208 Sqdn., Egypt. 14.10.23. R. J. Rodwell, to No. 14 Sqdn., Palestine. 14.10.23. R. H. W. Empson, E. S. Steddy, and J. V. Reeve, all to Aircraft Depot, Egypt. 14.10.23. H. T. Satterford, to Engine Repair Depot, Egypt. 14.10.23. A. A. C. Hyde, to No. 1 Flying Training Sch., Netheravon. 16.11.23. H. C. Bobbett, to Inspector of Recruiting, London. 20.11.23. S. Symonds, to No. 1 Group H.Q., Kenley. 22.11.23. J. W. Lissett, to No. 32 Sqdn., Kenley. 22.11.23. H. A. Dinnage, to Marine and Armament Experimental Estab., Isle of Grain. 18.11.23. B. C. W. Windle, D.F.C., to R.A.F. Depot (Non-effective Pool). 21.10.23, on transfer to Home Estab. S. M. Watson, to No. 2 Sqdn., Andover. 8.10.23. D. R. Sharnaa, M.C., to School of Army Co-operation, Old Sarum. 2.10.23. N. H. N. Fletcher, to R.A.F. Base, Leuchars. 12.11.23, on appointment to a Short Service Commn. E. C. K. Kingston, to R.A.F. Base, Gosport. 19.11.23. F. Jezzard, M.B.E., to H.M.S. *Argus*. 13.11.23. T. J. E. Thornton, to Marine and Armament Experimental Estab., Isle of Grain. 13.11.23. W. F. Davenport, to R.A.F. Depot (non-effective pool). 13.9.23, on transfer to Home Estab. F. H. Cashmore, to Boys' Wing, Cranwell. 23.11.23. J. E. V. Lindsey, to No. 4 Sqdn., S. Farnborough. 23.11.23. A. E. Dark, F. Wright, C. T. Waldington, G. C. Bladon, E. J. Ffoulkes-Jones, and E. Brewerton, D.F.C., all to R.A.F. Depot on transfer to Home Estab. 1.11.23. R. B. Sutherland, D.F.C., to No. 29 Sqdn., Duxford. 7.11.23. C. N. H. Bilney, to R.A.F. Base, Calshot. 1.12.23. G. V. Carey, to No. 24 Sqdn., Kenley. 1.12.23. A. B. Ellwood, D.S.C., to R.A.F. Base, Gosport, on transfer to Home Estab. 27.11.23. G. R. Burge, to R.A.F. Base, Leuchars (No. 440 Flight). 19.11.23. J. W. F. Merer, to No. 207 Sqdn., Eastchurch, on transfer to Home Estab. 28.11.23. M. F. Morris, to Central Flying School, Upavon. 1.12.23. H. G. Brookman, to R.A.F. Base, Leuchars. 1.12.23. R. R. Soar, D.S.C., R. M. Foster, D.F.C., A. M. Wray, M.C., A.F.C., L. G. Harvey, H. W. Heslop, J. W. Sole, R. E. Baugh, D. R. Mitchell, M.B.E., J. A. Elliott, G. J. Stroud, M.B.E., S. Upton, S. N. Webster, A.F.C., and J. T. O'Brien-Stunt, all to R.A.F. Depot on transfer to Home Estab. 21.10.23. M. W. Nolan and G. J. Rayner, both to R.A.F. Depot (non-effective pool) on transfer to Home Estab. 21.10.23. W. H. Markham, T. S. Horry, D.F.C., F. J. Fogarty, and A. E. Beilby, all to R.A.F. Depot on transfer to Home Estab. 13.10.23. J. E. R. Hyson and F. J. C. Rybot, both to R.A.F. Depot (non-effective pool) on transfer to Home Estab. 13.10.23.

Pilot Officers : W. T. D. Windham, to No. 100 Sqdn., Spittlegate. 1.12.23. F. W. M. Downer, to No. 2 Sqdn., Andover. 26.10.23. F. R. Lines, to No. 7 Sqdn., Bircham Newton. 5.11.23.

MODEL AEROPLANE RECORDS

Type of Machine.	British Record.		Dutch Record.		American Record.	
Single pusher (h.l.)	J. E. Louch ..	95 secs.	Voet ..	121 secs.	—	—
	—	—	v.d. Muelen	613 yds.	—	—
Single pusher (r.o.g.)	J. E. Louch ..	68 secs.	Michielsen ..	54⅗ secs.	—	—
	W. E. Evans ..	290 yds.	Voet ..	227 yds.	—	—
Single pusher (r.o.w.)	L. H. Slatter ..	35 secs.	—	—	—	—
Twin pusher (h.l.)	Collingwood Chown	145 secs.	Heuvelinck	144 secs.	R. Jaros ..	265 secs.
	R. Lucas	590 yds.	Lipjes ..	760 yds.	T. Hall	1,779 yds.
Twin pusher (r.o.g.)	S. C. Hersom ..	247 secs.	Heuvelinck	77⅖ secs.	R. Jaros ..	209 secs.
	L. H. Slatter ..	365 yds.	v.d. Muelen	459 yds.	W. Schwietzer ..	1,343 yds.
Twin pusher (r.o.w.)	S. C. Hersom ..	65 secs.	v.d. Muelen	30 secs.	B. Pond ..	172 secs.
	—	—	v.d. Muelen	202 yds.	—	—
Single tractor (h.l.)	J. E. Louch ..	91 secs.	Hoogland ..	105 secs.	D. Lathrop ..	240 secs.
	C. C. Dutton ..	266 yds.	Voet ..	420 yds.	B. Pond ..	821⅘ yds.
Single tractor (r.o.g.)	J. E. Louch ..	94 secs.	Blaauw ..	66⅖ secs.	P. Breckenridge	227⅗ secs.
	C. C. Dutton ..	190 yds.	v.d. Muelen	392 yds.	P. Breckenridge	895 yds.
Single tractor (r.o.w.)	C. C. Dutton ..	29 secs.	—	—	L. Hittle ..	116 secs.
Twin tractor (h.l.)	—	—	Voet ..	52⅘ secs.	—	—
Twin tractor (r.o.g.)	—	—	v.d. Muelen	55 secs.	—	—
Fuselage (h.l.	L. A. Gray ..	37 secs.	—	—	R. Jaros ..	21 secs.
Fuselage (r.o.g.)	S. C. Hersom ..	34 secs.	—	—	—	—
Farman pusher (h.l.)	C. J. Burchell / C. A. Rippon	20 secs.	—	—	—	—
Farman pusher (r.o.g.) ..	H. H. Bedford ..	17 secs.	—	—	—	—
Engine driven (r.o.g.) (c.a.) ..	D. A. Pavely ..	70 secs.	Sas ..	20 secs. and 54·7 yds.	—	—
,, ,, (petrol)	D. Stanger ..	51 secs.	—	—	—	—
Fuselage (c.a.) (r.o.g.)	D. A. Pavely ..	36⅕ secs.	—	—	—	—
Glider	C. J. Burchell ..	53⅘ secs.	—	—	—	—
Fuselage glider	W. L. Howes ..	40⅘ secs.	—	—	—	—

h.l. = hand-launched. r.o.g. = rise-off-ground. r.o.w. = rise-off-water. c.a. = compressed air.

Dutch records given by favour of the Secretary, P.A.S.C., Rotterdam. American records taken from *Aerial Age*.

BY DOUGLAS B. ARMSTRONG

Aero-Philately in America

THE spread of aero-philately is resulting in the formation of special coteries devoted to the collection and study of matters appertaining to the cult, in all parts of the world. This is as it should be, for although closely allied to the study of stamps, aero-philately is really on a separate plane from ordinary philately, and is governed by entirely different standards. To attempt to impose upon the aero-philatelist some of the time-worn tenets of philatelic faith is to rob the pursuit of much that is essential to a proper and authoritative history of the post in the air. As we have previously demonstrated, items such as semi-official or souvenir labels, special cancellations and cachets, which are anathema to the general stamp collector, have a legitimate and well-established place in the scheme of aero-philately. Great Britain, Belgium, and Germany already have their aero-philatelic clubs. Now comes news of the founding of the Aero-Philatelic Society of America, with Mr. J. A. Steinmetz of Philadelphia as its first President; Mr. H. A. Truby, Vice-President; and Mr. George W. Angers of Springfield, Mass, in the office of Secretary-Treasurer.

Mr. Steinmetz, who is also President of the Aero Club of Pennsylvania, possesses what is probably the finest collection of air post covers in the United States. Mr. Truby has been identified with aero-philately from its infancy; whilst Mr. Angers is a member of the Aerial League of America, and a prolific writer on air-post collecting.

The Pioneers

FIRST in the practical development of aviation, America was also first in the collection and study of "flown covers." I have before me an old prospectus of the Aero Mail Club, organised June 21, 1913, the purpose of which was "to further the interests of the Aero Mail cancellation enthusiasts, make researches among all previous aerial mail services, further its scope by a system of 'look-outs' for future trials and to keep its members in touch with one another, thus strengthening their personal interest and affording a means for completing their collections."

The Aero Mail Club rendered valuable pioneer service in the interests of aero-philately, until the entry of America into the Great War brought about a suspension of its activities. It is pleasing to note that some of its moving spirits are prominently associated with the new Aero-Philatelic Society of America. Long may it flourish!

Readers are invited to forward to the Editor of FLIGHT *letters, etc., bearing aerial stamps or postmarks for mention in this column, as well as out-of-the-way varieties, etc.*

We shall also be pleased to hear from correspondents interested in air-stamp collecting, and to answer any queries.

⁂ ⁂ ⁂ ⁂

Air Accident at Ivinghoe

THE Air Ministry announces that as a result of the investigation into the circumstances of the accident to aircraft G-E.B.B.S., which occurred at Ivinghoe on September 14 last, the Inspector of Accidents has arrived at the following conclusions:—

(*a*) That the accident was due to an error of judgment on the part of the pilot, causing the aeroplane to lose flying speed near the ground.

(*b*) That when the accident occured the pilot was attempting to make a landing on account of the bad weather conditions.

Return of H.M.S. "Pegasus" from the Mediterranean

IT is notified that H.M.S. *Pegasus*, together with the Royal Air Force unit now in the ship, will arrive at Devonport from Malta about November 30.

IMPORTS AND EXPORTS, 1922-1923

AEROPLANES, airships, balloons and parts thereof (not shown separately before 1910). For 1910 and 1911 figures see "FLIGHT" for January 25, 1912; for 1912 and 1913, see "FLIGHT" for January 17, 1914; for 1914, see "FLIGHT" for January 15, 1915; for 1915, see "FLIGHT" for January 13, 1916; for 1916, see "FLIGHT" for January 11, 1917; for 1917, see "FLIGHT" for January 24, 1918; for 1918, see "FLIGHT" for January 16, 1919; for 1919, see "FLIGHT" for January 22, 1920; for 1920, see "FLIGHT" for January 13, 1921; for 1921, see "FLIGHT" for January 19, 1922; and for 1922 see "FLIGHT" for January 18, 1923.

	Imports		Exports		Re-Exports	
	1922.	1923.	1922.	1923.	1922.	1923.
	*	*	*	*	*	*
Jan. ..	1,152	466	76,552	60,079	23	280
Feb. ..	567	641	69,129	120,236	1,100	3,040
Mar. ..	1,471	589	166,607	71,945	100	689
April ..	3,846	8,508	139,995	167,757	5,880	462
May ..	2,416	845	167,999	55,427	4,254	728
June ..	816	1,433	129,137	141,381	14,530	1,410
July ..	1,039	192	24,405	62,025	—	1,334
Aug. ..	198	2,054	88,910	57,704	685	344
Sept. ..	3,043	578	71,508	39,069	44	106
Oct. ..	633	705	40,225	80,002	90	8,272
	15,181	16,011	974,467	855,625	26,706	16,665

⁂ ⁂ ⁂ ⁂

PUBLICATIONS RECEIVED

Aeronautical Research Committee. Reports and Memoranda:

No. 872 (Ae. 108). Biplane Investigation with R.A.F. 15 Section. Part III.—Tests at Various Staggers and Gap Chord Ratios. By W. L. Cowley, A. G. Gadd, L. J. Jones, and S. W. Skan. May, 1923. London: H.M. Stationery Office, Kingsway, W.C. 2. Price 1*s.* net.

No. 873 (Ae. 109). Elimination of the Static Pressure Gradient Along Wind Tunnels of the N.P.L. Type. By L. F. G. Simmons and E. Ower. June, 1923. London: H.M. Stationery Office, Kingsway, W.C. Price 9*d.* net.

No. 842 (M. 17). The Production and Heat-Treatment of Chill-Castings in an Aluminium Alloy "Y." By W. Rosenhain, S. L. Archbutt and S. A. E. Wells. December, 1922. Price 1*s.* net.

No. 851 (Ae. 93). The Comparison of the Manœuvrability of Aeroplanes by the Use of a Cinematograph Camera. By H. A. Francis. December, 1922. Price 1*s.* net.

No. 876 (Ae. 110). Lift, Drag, and Pitching Moment of the 1/5th Scale Bristol Fighter Model in the Duplex Wind Tunnel. By E. F. Relf and E. Ower. September, 1923. Price 9*d.* net. H.M. Stationery Office, Kingsway, London, W.C. 2.

No. 876 (Ae. 104). The Interference of Wind Channel Walls on the Aerodynamic Characteristics of an Aerofoil. By H. Glauert. March, 1923. Price 4½*d.* post free. London: H M.Stationery Office, Kingsway, W.C. 2.

⁂ ⁂ ⁂ ⁂

AERONAUTICAL PATENT SPECIFICATIONS

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

APPLIED FOR IN 1922

Published November 29, 1923

18,504. H. LEITNER. Screw propellers. (206,197.)
20,136. RAUL, MARQUIS OF PATERAS PESCARA. Aircraft. (183,483.)
22,166. W. W. WRIGHT. Two-stroke I.C. revolving-cyl. engine. (206,270.)
22,865. LUFTSCHIFFBAU ZEPPELIN GES. and J. ERHARDT. Gangways for airships. (184,806.)
24,684. J. T. PARR. Safety device for aircraft. (206,297.)

APPLIED FOR IN 1923

Published November 29, 1923

16,309. SOC. ANON. DITE "BLERIOT AERONAUTIQUE." Frame-pieces for ribs of aeroplane wings. (201,889.)

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The Aircraft Engineer and Airships

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